SOLAR OBSERVATIONS.

SOLAR AND SKY RADIATION MEASUREMENTS DURING MARCH, 1922.

By IRVING F. HAND, Temporarily in Charge.

For a description of instruments and exposures, and an account of the method of obtaining and reducing the measurements, the reader is referred to this REVIEW for April, 1920, **48**:225.

From Table 1 it is seen that direct solar radiation intensities averaged close to normal values for March at Santa Fe, N. Mex., and slightly below normal at the other three stations.

TABLE 1.—*Solar radiation intensities during March, 1922.*

WASHINGTON, D. C.

[Gram-calories per minute per square centimeter of normal surface.]

Date.	Sun's zenith distance.										
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon.
	75th meridian time.	Air mass.									Local mean solar time.
		A. M.					P. M.				
	e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Mar. 3	3.00	.....	.....	.....	1.19	.....	.....	.....	.....	.....	2.16
6	4.17	.....	0.78	0.90	1.04	.....	1.20	0.96	0.83	0.65	5.36
8	2.74	.....	.....	.....	.....	.....	1.09	.....	.....	.....	2.62
13	4.57	.....	0.78	0.93	1.10	.....	.....	.....	.....	.....	4.57
16	3.15	.....	0.83	0.98	1.18	.....	0.91	0.76	0.60	.....	2.36
17	2.06	.....	1.00	1.15	1.32	1.52	1.15	0.95	0.78	0.64	2.36
18	1.96	.....	0.92	1.10	.....	.....	.....	.....	.....	.....	1.96
23	1.96	.....	1.01	1.16	1.33	1.52	1.26	1.02	0.83	0.68	1.96
25	5.56	.....	.....	.....	0.75	.....	0.74	0.60	.....	.....	6.02
Means	.....	.....	0.89	1.04	1.13	.....	1.06	0.86	0.76	0.66	.....
Departures	.....	.....	+0.06	+0.08	−0.03	.....	−0.06	−0.06	−0.04	−0.03	.....

MADISON, WIS.

Mar. 2	1.19	0.92	1.02	1.16	1.33	.....	1.34	.....	.....	.....	1.60
3	1.96	.....	.....	.....	1.20	.....	1.23	.....	.....	.....	2.74
4	2.74	.....	0.90	1.10	1.31	1.57	.....	.....	.....	.....	3.81
11	3.63	.....	0.56	0.77	1.07	.....	1.05	.....	.....	.....	3.31
13	6.27	.....	.....	.....	.....	.....	1.15	.....	.....	.....	7.57
15	2.62	.....	.....	1.19	1.35	.....	1.26	1.08	.....	.....	2.49
21	2.26	.....	.....	.....	1.32	.....	.....	.....	.....	.....	2.49
22	1.96	.....	0.86	.....	.....	.....	.....	.....	.....	.....	3.30
Means	.....	(0.92)	0.84	1.06	1.26	.....	1.21	(1.08)	.....	.....	.....
Departures	.....	−0.05	−0.19	−0.13	−0.06	.....	−0.11	−0.08	.....	.....	.....

LINCOLN, NEBR.

Mar. 1	1.07	.....	1.01	1.15	1.34	1.54	.....	.....	.....	.....	1.96
2	1.42	.....	.....	.....	1.02	.....	1.20	0.97	0.76	0.69	2.36
3	1.96	0.68	0.91	1.02	1.29	1.64	1.37	1.18	1.01	0.88	2.49
4	3.00	.....	0.91	1.06	1.23	.....	.....	.....	.....	.....	4.57
7	1.88	.....	1.06	1.15	1.36	.....	.....	.....	.....	.....	3.30
11	2.87	.....	.....	0.99	1.21	.....	.....	.....	.....	.....	3.45
Means	.....	(0.68)	0.97	1.03	1.24	.....	(1.28)	(1.08)	(0.88)	(0.78)	.....
Departures	.....	−0.21	+0.04	−0.05	−0.05	.....	+0.02	±0.00	+0.05	±0.00	.....

SANTA FE, N. MEX.

Mar. 3	2.16	.....	.....	.....	.....	.....	.....	.....	.....	1.13	2.26
6	1.60	.....	.....	.....	1.50	1.71	.....	.....	.....	.....	1.02
7	1.68	.....	.....	1.21	1.46	1.76	.....	.....	.....	.....	1.07
8	1.78	.....	0.77	1.02	1.16	.....	.....	.....	.....	.....	1.88
10	1.78	.....	.....	0.98	1.32	.....	.....	.....	.....	.....	1.96
13	2.16	.....	.....	.....	.....	.....	1.46	1.28	1.21	1.06	2.87
20	2.74	.....	.....	1.28	1.50	1.66	.....	.....	.....	.....	2.16
Means	.....	.....	(0.77)	1.12	1.39	.....	(1.46)	(1.28)	(1.21)	(1.10)	.....
Departures	.....	.....	−0.41	−0.07	−0.05	.....	+0.05	+0.01	+0.08	+0.04	.....

Table 2 shows that the total solar and sky radiation received on a horizontal surface averaged below the March normal at both Washington and Madison.

Skylight polarization measurements made on six days at Washington, give a mean of 56 per cent, with a maximum of 64 per cent on the 23d. These are about average March values for Washington. At Madison the value of 61 per cent obtained on the 21st is slightly below the normal for the month. Snow-covered ground prevented other observations at this station.

TABLE 2.—*Solar and sky radiation received on a horizontal surface.*

Week beginning.	Average daily radiation.			Average daily departure for the week.			Excess or deficiency since first of year.		
	Washington.	Madison.	Lincoln.	Washington.	Madison.	Lincoln.	Washington.	Madison.	Lincoln.
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Feb. 26	206	377	.....	−83	+92	.....	−750	+1,052	.....
Mar. 5	273	296	.....	−40	−13	.....	−1,027	+960	.....
12	383	282	.....	+45	−47	.....	−715	+631	.....
19	337	273	.....	−20	−72	.....	−854	+228	.....
26	267	182	.....	−105	−177	.....	−1,591	−1,112	.....

MEASUREMENTS OF THE SOLAR CONSTANT OF RADIATION AT CALAMA, CHILE.

By C. G. ABBOT, Assistant Secretary.

[Smithsonian Institution, Washington, April 29, 1922.]

In continuation of preceding publications, the following table contains the results for the solar constant of radiation obtained at Montezuma, near Calama, Chile, in February, 1922. The values of ρ/ρ sc are given at air mass 2, or if not the air mass is stated. The reader is referred for further statements regarding the arrangement and meaning of the table to the REVIEW for February, August, and September, 1919.

As stated in connection with the results for January, MONTHLY WEATHER REVIEW, February, 1922, **50**: 96, the observations of February were made entirely by the old or fundamental method, owing to the loss of part of one of the instruments in a high wind. It is expected that in March the short-method values will reappear.

Date.	Solar constant.	Method.	Grade.	Transmission coefficient at 0.5 micron.	Humidity.			Remarks.
					ρ sc.	V. P.	Rel. Hum.	
1922 P. M.	*cal.*					*cm.*	*Per cent.*	
Feb. 10	1.910	E_s	VG..	0.855	[1] 0.432	0.38	20	Clouds formed very near sun during last bolograph.
A. M.								
12	1.977	E_s	VG..	.870	[2] .646	.42	42	Cirri in north.
13	1.938	E_s	VG+	.861	.576	.38	35	Clouds low in east and west.
15	1.967	E_s	VG+	.825	.381	.41	35	Cirri over high peaks.
18	1.996	E_s	VG..	.835	[3] .422	.48	45	Cirri scattered about sky.
19	1.932	E_s	VG..	.834	[4] .381	.62	64	Very heavy cumulus bank in north.
22	1.958	E_s	VG..	.840	.400	.52	50	Cloudless.
23	1.930	E_s	E....	.870	.465	.48	43	Cloudless.
24	1.969	E_s	VG..	.855	.498	.53	48	Cloudless.
25	1.936	E_s	VG..	.865	[5] .444	.63	62	Cloudless.
28	1.940	E_s	E−	.844	.499	.63	59	Cloudless.

[1] Air mass 2.57.
[2] Air mass 2.28.
[3] Air mass 1.86.
[4] Air mass 2.24.
[5] Air mass 1.83.